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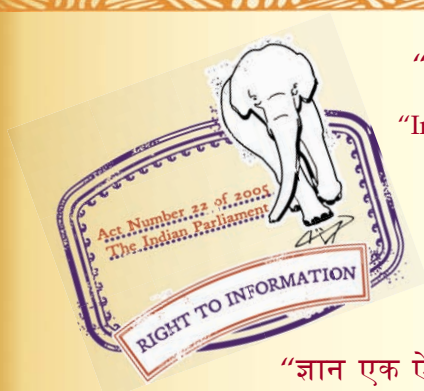
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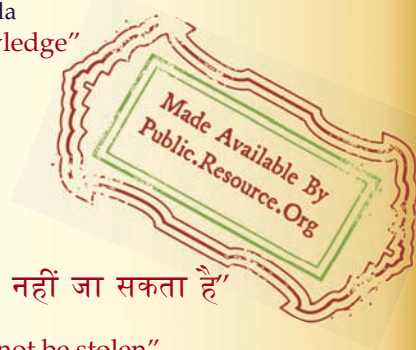
IS 8144 (1997): Multipurpose dry batteries [ETD 10: Primary Cells and Batteries]



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“Knowledge is such a treasure which cannot be stolen”

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IS 8144 : 1997

भारतीय मानक

बहुप्रयोजी शुष्क बैटरियाँ — विशिष्ट

Indian Standard

**MULTIPURPOSE DRY BATTERIES —
SPECIFICATION**

ICS 29.220.10

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BHADUR SHAH ZAFAR MARG
NEW DELHI 110002

AMENDMENT NO. 1 FEBRUARY 2006
TO
IS 8144 : 1997 MULTIPURPOSE DRY BATTERIES —
SPECIFICATION

(First Revision)

[Page 1, clause 9.1.1(c)] — Add the following at the end:

‘Month and year of manufacture or expiry shall be in accordance with 6.1(f) and 6.1(g) of IS 6303.’

(Page 1, clause 10.1) — Insert the following matter after 10.1:

‘**10.1.1 Accelerated Acceptance Test** — For the purpose of accepting a manufactured lot of batteries by any customer/agency, the following accelerated acceptance test shall be carried out for conformance to performance standards:

Sl No.	Battery Type	Resistance (Ohms)	Period of Discharge	End Voltage (V)	Initial Life Required (Hours)
1	R6	150	Continuous	0.90	65
2	R14	75	Continuous	0.90	75
3	R20	40	Continuous	0.90	80

NOTES

1 During discharge, no leakage shall be observed up to 0.9 V.

2 Accelerated tests are intended for quick acceptance of manufactured lot. However, type tests as laid down under 10.2 shall be performed for full conformance.’

(Page 2, clause 10.2.4.1, after ‘Delayed life test’) — Insert ‘Accelerated acceptance test 3’.

(Page 2, clause 10.2.4.1, Total) — Substitute ‘16’ for ‘13’.

[Page 2, clause 10.3(c)] — Add the following:

‘d) Accelerated acceptance test (10.1.1).’

Amend No. 1 to IS 8144 : 1997

(Page 2, clause 10.5.1, line 2) — Substitute '7.7' for '7.6'.

(Page 2, clause 10.5.3, line 2) — Substitute '10.4' for '9.4'.

(Page 2, clause 11.1) — Substitute the following for the existing matter:

'Refer Annex B of IS 6303.'

(Page 3, Tables 1, 2 and 3, col heading 3) — Substitute 'End Voltage (V)' for 'End Voltage'.

(Page 3, Table 1, row 1, col 7) — Substitute '84' for '80'.

(Page 3, Table 1, row 2, col 7) — Substitute '59' for '55'.

(Page 3, Table 1, row 3, col 7) — Substitute '126' for '95'.

(Page 3, Table 1, row 3, col 6) — Substitute '135' for '108'.

(Page 3, Table 2, row 1, col 7) — Substitute '203' for '190'.

(Page 3, Table 2, row 2, col 7) — Substitute '77' for '72'.

(Page 3, Table 2, row 3, col 7) — Substitute '11.2' for '10'.

(Page 3, Table 3, row 1, col 7) — Substitute '546' for '570'.

(Page 3, Table 3, row 2, col 7) — Substitute '105' for '100'.

(Page 3, Table 3, row 3, col 7) — Substitute '17.5' for '15'.

(Page 4, Annex A, clause A-3.1) — Substitute the following for the existing clause:

'A-3.1 The batteries shall be drawn according to col 1 and 2 of Table 4 and shall be divided into four groups in R6, R14 and R20 respectively such that each group shall have sample size (n_1) as mentioned in col 4 of Table 4.'

(Page 4, Annex A, clause A-3.1.2) — Substitute the following for the existing clause:

'A-3.1.2 For batteries R14 and R20, out of the four groups, one group shall be tested for dimensions, terminals and markings, the second for initial life test for flashlights application, the third for initial life test for transistor radio application and the fourth group for initial life test for cassette tape recorder.'

Amend No. 1 to IS 8144 : 1997

(*Page 4, Table 4, col heading 2*) — Substitute the following for the existing:

**'Number of Samples
for R6, R14
and R20'**

(*Page 4, Table 4, col 3*) — Delete.

(*Page 5, Annex B*) — Delete.

(ET 10)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 OCTOBER 2010
TO
IS 8144 : 1997 MULTIPURPOSE DRY BATTERIES —
SPECIFICATION

(First Revision)

[Page 1, clause 9.1.1(b)] — Delete.

(Page 2, clause 10.6) — Add the following note after 10.6.3:

'NOTE - For this test, the sample shall be collected within two months from the date of manufacture.'

(ETD 10)

Reprography Unit, BIS, New Delhi, India

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Primary Cells and Batteries Sectional Committee had been approved by the Electrotechnical Division Council.

This Indian Standard was first published in 1976. This revision affects various modifications in the requirements of multipurpose dry batteries to bring it in line with relevant IEC.

Apart from dry batteries for specific applications like flash lights, transistor radio receivers, photoflash and hearing aids, dry batteries suitable for multipurpose applications are being manufactured in the country because of its applicability in choices and use to the common consumer. This standard which covers such multipurpose dry batteries is expected to provide variety rationalisation without sacrificing quality for a given specific application.

In view of the wider application of dry batteries of sizes R 14 and R 20 in cassette tape recorders, performances requirements for these two sizes of batteries have been included in the standard.

The storage life has been revised to twelve months besides meeting the leakproof test to 0.6 volts.

Code of practice for use and disposal of dry batteries have been included in Annex B.

Since the performance values laid down for the multipurpose cells are at par with the cells for specific application with the cells of designation R 6, R 14 and R 20 Specified in IS 203 : 1984 'Specification for dry batteries for flashlights (*third revision*)', IS 2576 : 1975 'Specification for dry batteries for transistor radio receivers (*first revision*)' and IS 7218 : 1974 'Dry batteries for hearing aids', it was decided to withdraw the above individual standards.

This standard shall be read in conjunction with IS 6303 : 1984 'General requirements and methods of test for dry cells and batteries'. In the preparation of this standard, assistance has been derived from IEC Publication 86 - 2 (1972) 'Primary cells and batteries : Part 2 Specification sheets (*third edition*)' issued by the International Electrotechnical Commission.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960 'Rule for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

MULTIPURPOSE DRY BATTERIES — SPECIFICATION

(*First Revision*)

1 SCOPE

1.1 This standard lays down the dimensions, tests and requirements of Leclanche type dry batteries of designations R 6 for use with flashlights, transistor radio receivers and hearing aids and R 14 and R 20 for use in flashlights, transistor radio receivers and cassette taperecorders.

2 REFERENCES

2.1 The Indian Standards listed below are necessary adjuncts to this standard:

<i>IS No.</i>	<i>Title</i>
1885	Electrotechnical vocabulary : Part (Part 15) : 1967
15	Primary cells and batteries
4905 : 1968	Methods for random sampling
6303 : 1984	Specification for General requirements and methods of test for dry cells and batteries
2652 : 1976	Schedule of terminals for leclanche' type primary batteries (first revision)

3 TERMINOLOGY

3.1 For the purpose of this standard, the definitions given in IS 1885 (Part 15) and IS 6303 shall apply.

4 DESIGNATION OF CELLS AND BATTERIES

4.1 The cells and batteries shall be designated in accordance with 3 of IS 6303.

5 DIMENSIONS**5.1 Unit Cells**

Nominal overall dimensions of cells of which the batteries are usually made are given in IS 6303.

5.2 Batteries

Nominal voltages and the overall dimensions of batteries R 6, R 14 and R 20 shall conform to those given in Tables 1, 2 and 3 respectively.

6 MATERIALS AND CONSTRUCTION

6.1 The materials and construction shall be in accordance with 5 of IS 6303.

7 TERMINALS

7.1 The terminal arrangements shall be as specified in Tables 1, 2 and 3.

7.2 The terminals shall provide and maintain good electrical contact with the external circuit and shall be so secured in the battery that they are not displaced by insertions and withdrawals in normal use.

8 REQUIREMENTS

8.1 The performance requirements of batteries R 6, R 14 and R 20 shall be as given in Tables 1, 2 and 3 respectively.

9 MARKING

9.1 The marking shall be done in accordance with 6 of IS 6303.

9.1.1 In addition the following marking shall also be done:

- a) Application of the battery namely multi - purpose shall be marked on all types of batteries that is R 6, R 14 and R 20. Alternatively a pictorial depiction may be marked on the outer jacket of the battery.
- b) Unit price shall be marked on all type of batteries.
- c) Month and year of manufacture in all numeric form for example 03.96 for March 1996 shall be marked either on the outer jacket or on the top or bottom of the individual battery.

10 TESTS

10.1 General provisions of 7.1 to 7.3 of IS 6303 shall apply.

10.2 Type Tests

10.2.1 The battery R 6 shall be subjected to the tests mentioned in 10.2.4 for each application given in Table 1.

10.2.2 The battery R 14 shall be subjected to the tests mentioned in 10.2.4 for each application given in Table 2.

10.2.3 The battery R 20 shall be subjected to the tests mentioned in 10.2.4 for each application given in Table 3.

10.2.4 Type tests shall comprise of the following:

- a) Checking of dimensions and terminals (5 and 7),
- b) Checking of markings (9),
- c) Initial life test (10.4),
- d) Delayed life test (10.5),
- e) Materials and construction (6),
- f) Delayed life test under dry heat conditions (10.6), and
- g) Leakage test for batteries marked leak proof or any other marking to similar effect (10.7).

10.2.4.1 *Samples for type tests*

The number of samples for each battery designation and each application required for type tests shall be as under :

	<i>No. of Samples</i>
Checking of dimensions and terminals	} All samples given below
Checking of markings	
Initial life test	3
Delayed life test	3
Materials and construction	1
Delayed life test under dry heat conditions	3
Delayed life test 12 months	3
Total	13

10.3 **Acceptance Tests**

The following shall constitute the acceptance tests:

- a) Checking of dimensions and terminals (5 and 7)
- b) Checking of markings (9), and
- c) Initial life test for each application and each battery designation (10.4).

10.3.1 *Samples and Criteria for Acceptance*

The samples for acceptance tests and the criteria for acceptance shall be in accordance with Annex A.

10.4 **Initial Life Test**

10.4.1 The test shall be carried out in accordance with 7.5 of IS 6303 with the details given in Tables 1, 2 and 3.

10.4.2 The following readings shall be taken:

- a) Initial closed-circuit voltage, and

- b) Closed circuit voltage at the end of each discharge period.

10.4.3 The test shall be continued until the closed circuit voltage of the battery falls below the appropriate end - point voltages specified in Tables 1, 2 and 3. The life of the battery shall include the full discharge period for the day during which the voltage drops for the first time below the specified end point for the battery.

10.4.4 The batteries shall not show leakage during or at the end of the test.

10.5 **Delayed Life Test**

10.5.1 The test shall be carried out in accordance with 7.6 of IS 6303.

10.5.2 The batteries shall be stored for a period as specified in Tables 1, 2 and 3.

10.5.3 After storage the batteries shall be tested in accordance with 9.4. The batteries shall meet the requirements specified in Tables 1, 2 and 3.

10.5.4 The batteries shall not show leakage during storage, during discharge or at the end of discharge.

10.6 **Delayed life Test Under Dry Heat Conditions**

10.6.1 The batteries shall be stored in accordance with 7.8.1 of IS 6303.

10.6.2 After storage the batteries shall be tested for life as in 10.4. The rated life of the batteries shall be not less than the appropriate values in Tables 1, 2 and 3.

10.6.3 The batteries shall not show leakage during storage, during discharge or at the end of the discharge.

10.7 **Leakage Test**

10.7.1 After the life value has been determined under the initial life test in accordance with 10.4, the discharge shall be continued in the same manner until the voltage on load drops for the first time below 0.6 volts per cell.

10.7.2 No electrolyte, sealing compound or other internal component shall appear on any of the external surface of the battery.

11 **CODE OF PRACTICE FOR USE AND DISPOSAL OF BATTERIES**

11.1 In addition to Annex B given in IS 6303, the precautions for battery uses shall be taken as given in Annex B.

Table 1 Battery R 6

(Clauses 5.2, 7.1, 8.1, 10.2.1, 10.4.1, 10.4.3, 10.5.2, 10.5.3 and 10.6.2)

- a) Dimensions — Diameter : 14.5 mm (*Max*), tolerance : 1.0 mm
 Height : 50.5 mm (*Max*), tolerance : 1.5 mm
 Terminals : CP and FC (see IS : 2652)
- b) Nominal Voltage — 1.5 V
- c) Performance

Resistance (Ω)	Discharge Schedule	End Voltage	Rated Life				Applications
			Initial	Delayed 6 Months	Delayed Under Dry Heat Condition	Delayed 12 Months	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
5	5 minutes per day 5 days a week	0.9	120 minutes	95 minutes	90 minutes	80 minutes	Flashlights
150	4 hours per day ; at 20 hours interval 5 days a week	0.9	84 hours	68 hours	63 hours	55 hours	Transistor radio receivers
300	12 hours per day ; at 12 hour intervals 5 days a week	0.9	180 hours	144 hours	108 hours	95 hours	Hearing aids

Table 2 Battery R 14

(Clauses 5.2, 7.1, 8.1, 10.2.2, 10.4.1, 10.4.3, 10.5.2, 10.5.3 and 10.6.2)

- a) Dimensions — Diameter : 26.2 mm (*Max*), tolerance : 1.5 mm
 Height : 50 mm (*Max*), tolerance : 1.5 mm
 Terminals : CP and FC (see IS : 2652)
- b) Nominal Voltage — 1.5 V
- c) Performance

Resistance (Ω)	Discharge Schedule	End Voltage	Rated Life				Applications
			Initial	Delayed 6 Months	Delayed Under Dry Heat Condition	Delayed 12 Months	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
5	10 minutes per day 5 days a week	0.9	290 minutes	230 minutes	220 minutes	190 minutes	Flashlights
75	4 hours per day at 20 hour intervals 5 days a week	0.9	110 hours	88 hours	82 hours	72 hours	Transistor radio receivers
15	1 hour per day at at 23 hour intervals 5 days a week	0.9	16 hours	13 hours	12 hours	10 hours	Cassette tape recorder

Table 3 Battery R 20

(Clauses 5.2, 7.1, 8.1, 10.2.3, 10.4.1, 10.4.3, 10.5.2, 10.5.3 and 10.6.2)

- a) Dimensions — Diameter : 34.2 mm (*Max*), tolerance : 2 mm
 Height : 61.5 mm (*Max*), tolerance : 2 mm
 Terminals : CP and FC (see IS : 2652)
- b) Nominal Voltage — 1.5 V
- c) Performance

Resistance (Ω)	Discharge Schedule	End Voltage	Rated Life				Applications
			Initial	Delayed 6 Months Heat Condition	Delayed Under Dry	Delayed 12 Months	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
5	30 minutes per day 23½ hour intervals 5 days a week	0.9	780 minutes	630 minutes	600 minutes	570 minutes	Flashlights
40	4 hours per day ; at 20 hour intervals 5 days a week	0.9	150 hours	120 hours	112.5 hours	100 hours	Transistor radio receivers
15	1 hour per day ; at 23 hour interval 5 days a week	0.9	25 hours	20 hours	18 hours	15 hours	Cassette tape recorders

ANNEX A

(Clause 10.3.1)

SAMPLING SCHEME FOR ACCEPTANCE OF MULTIPURPOSE BATTERIES

A-1 LOT

A-1.1 In any consignment, all the batteries of the same designation and rated voltage manufactured by the same factory, during the same period, shall be grouped together to constitute a lot.

A-1.1.1 Batteries shall be taken and tested for each lot. A battery failing to satisfy any one of the appropriate requirements shall be called a defective.

A-2 SCALE OF SAMPLING

A-2.1 Batteries shall be selected at random from each lot in accordance with Table 4. For the purpose of random selection provisions contained in IS 4905 shall be used.

A-3 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

A-3.1 The batteries shall be drawn according to col 1, 2, 3 of Table 4 depending upon the battery designation, and shall be divided into four groups in the case of R 6 and three groups in the case of R 14 and R 20 each, such that each group shall have a sample size (n_1) as mentioned in col 4 of Table 4.

A-3.1.1 For battery R 6, out of the four groups one group shall be tested for dimension terminals and

markings, the second for initial life test for flashlight application the third group for initial life test for transistor radio application and fourth group for initial life test for hearing aid application.

A-3.1.2 For batteries R 14 and R 20, out of the three groups, one groups shall be tested for dimensions, terminals and markings, the second for initial life test for flashlight application and the third for initial life test for transistor radio application.

A-3.2 In any group, if the number of defective batteries is less than or equal to c_1 the lot shall be considered as conforming to that requirement. If the number of defectives in a group is greater than or equal to c_2 the lot shall be declared to have failed for that requirement. In any group, if the number of defective batteries lies between c_1 and c_2 , a further sample of size as mentioned in col 5 (n_2) shall be drawn and tested for that group requirement. If the number of defectives in the combined sample ($n_1 + n_2$) is greater than or equal to c_3 the lot shall be rejected, otherwise not.

A - 3.3 The lot shall be declared to have conformed to the specification when the batteries conform to the requirement as mentioned in A-3.1.1, A-3.1.2 and A-3.2.

Table 4 Sampling Plan
(Clauses A - 2.1 and A - 3.1)

Lot Size	Number of Samples for R6	Number of Samples for R14 and R20	First Stage n_1	Second Stage n_2	$n_1 + n_2$	c_1	c_2	c_3
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Up to 300	20	15	5	5	10	0	2	2
301 to 1 000	32	24	8	8	16	0	2	2
1 001 " 3 000	52	39	13	13	26	0	3	4
3 001 " 10 000	80	60	20	20	40	1	4	5
10 001 " 35 000	128	96	32	32	64	2	5	7
35 001 " 150 000	200	150	50	50	100	3	7	9
150 001 " 500 000	320	240	80	80	160	5	9	13
500 001 and above	500	375	125	125	250	7	11	19

NOTE — The sampling plan given in the table envisages that lots containing about 4 percent defective batteries will be accepted 95 percent of times, and lots containing 15 percent to 30 percent defective batteries will be rejected 90 percent of times.

ANNEX B

(Clause 11.1)

PRECAUTIONS FOR BATTERY USAGE

B-1 Following additional precautions for battery usage should only be taken:

- a) Keep batteries away from fire. They may explode.
- b) Take batteries out of the appliance, if you do not intend using it for one month or more.
- c) Do not charge batteries, they may leak or explode.
- d) Do not use batteries below 0.6 volts, they may leak.

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